

# SN54ALS259, SN74ALS259 8-BIT ADDRESSABLE LATCHES

SDAS217A – DECEMBER 1982 – REVISED DECEMBER 1994

- **8-Bit Parallel-Out Storage Register Performs Serial-to-Parallel Conversion With Storage**
- **Asynchronous Parallel Clear**
- **Active-High Decoder**
- **Enable/Disable Input Simplifies Expansion**
- **Expandable for n-Bit Applications**
- **Four Distinct Functional Modes**
- **Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs**

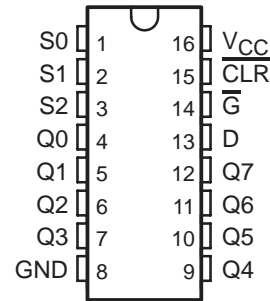
## description

These 8-bit addressable latches are designed for general-purpose storage applications in digital systems. Specific uses include working registers, serial-holding registers, and active-high decoders or demultiplexers. They are multifunctional devices capable of storing single-line data in eight addressable latches and being a 1-of-8 decoder or demultiplexer with active-high outputs.

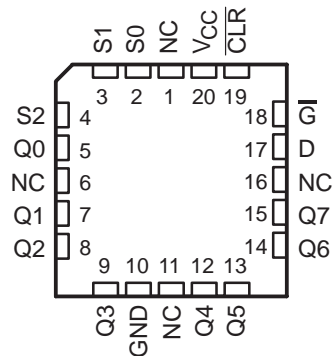
Four distinct modes of operation are selectable by controlling the clear ( $\overline{\text{CLR}}$ ) and enable ( $\overline{\text{G}}$ ) inputs as shown in the function table. In the addressable-latch mode, data at the data-in terminal is written into the addressed latch. The addressed latch follows the data input with all unaddressed latches remaining in their previous states. In the memory mode, all latches remain in their previous states and are unaffected by the data or address inputs. To eliminate the possibility of entering erroneous data in the latches,  $\overline{\text{G}}$  should be held high (inactive) while the address lines are changing. In the 1-of-8 decoding or demultiplexing mode, the addressed output follows the level of the D input with all other outputs low. In the clear mode, all outputs are low and unaffected by the address and data inputs.

The SN54ALS259 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS259 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54ALS259 . . . J PACKAGE  
SN74ALS259 . . . D OR N PACKAGE  
(TOP VIEW)



SN54ALS259 . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection

## Function Tables

FUNCTION

INPUTS		OUTPUT OF ADDRESSED LATCH	EACH OTHER OUTPUT	FUNCTION
$\overline{\text{CLR}}$	$\overline{\text{G}}$			
H	L	D	$Q_{iO}$	Addressable latch
H	H	$Q_{iO}$	$Q_{iO}$	Memory
L	L	D	L	8-line demultiplexer
L	H	L	L	Clear

D = the level at the data input.

$Q_{iO}$  = the level of  $Q_i$  ( $i = Q, 1, \dots, 7$  as appropriate) before the indicated steady-state input conditions were established.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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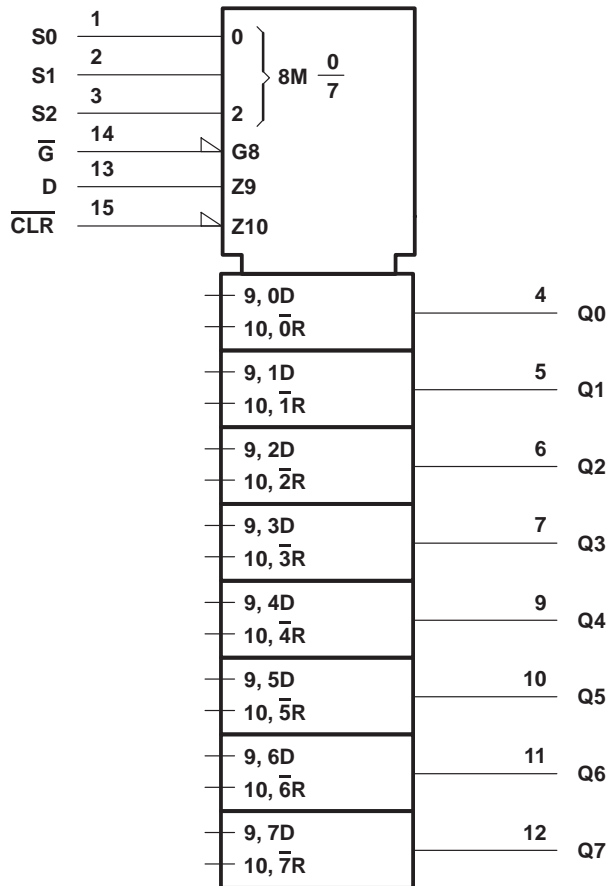
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## Function Tables (Continued)

SELECT INPUTS			LATCH ADDRESSED
S2	S1	S0	
L	L	L	0
L	L	H	1
L	H	L	2
L	H	H	3
H	L	L	4
H	L	H	5
H	H	L	6
H	H	H	7

logic symbol†

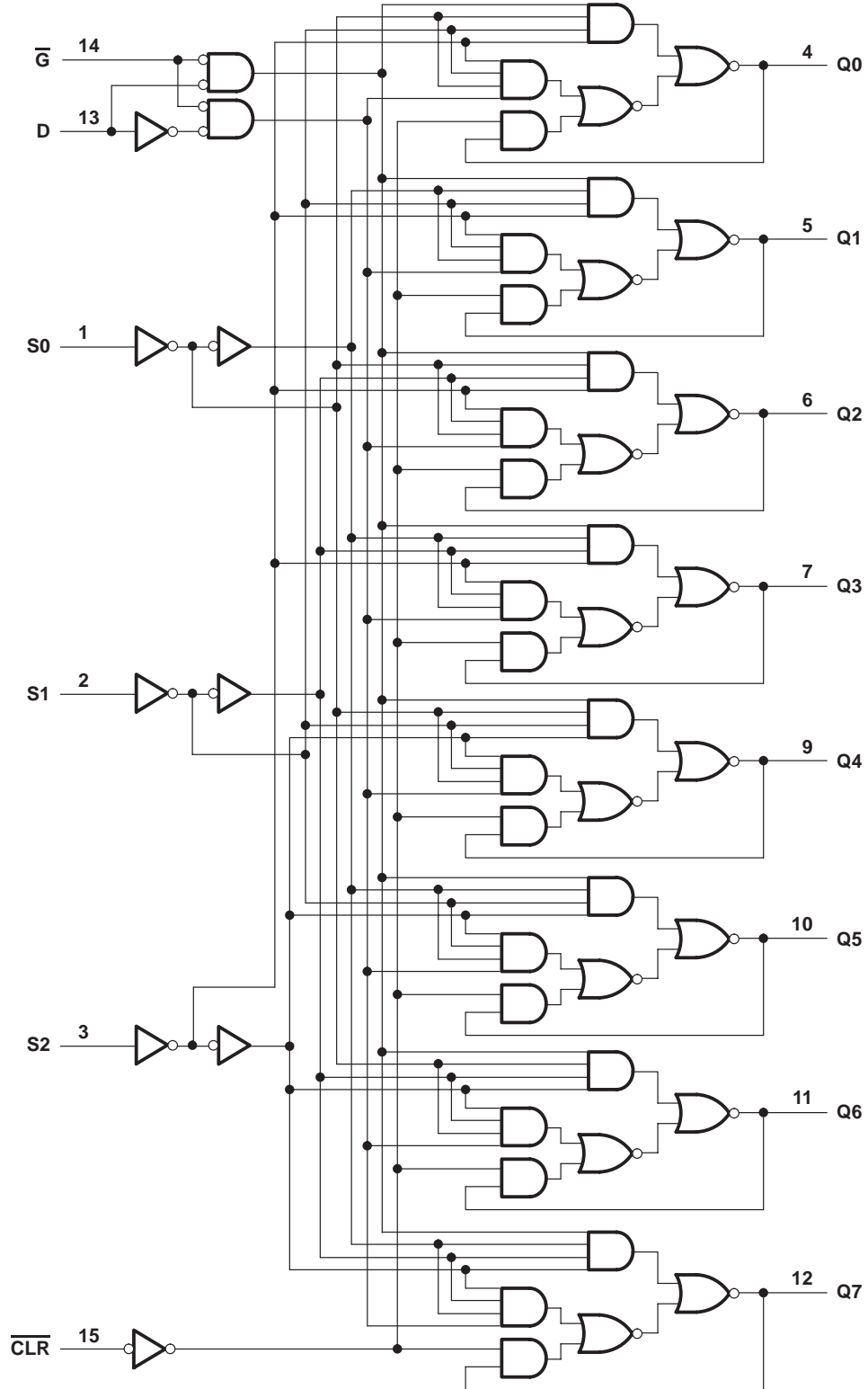


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.  
Pin numbers shown are for the D, J, and N packages.

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## logic diagram (positive logic)



Pin numbers shown are for the D, J, and N packages.



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## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, $V_{CC}$	7 V
Input voltage, $V_I$	7 V
Operating free-air temperature range, $T_A$ : SN54ALS259	-55°C to 125°C
SN74ALS259	0°C to 70°C
Storage temperature range	-65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## recommended operating conditions

		SN54ALS259			SN74ALS259			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			2			V
$V_{IL}$	Low-level input voltage			0.7			0.8	V
$I_{OH}$	High-level output current			-0.4			-0.4	mA
$I_{OL}$	Low-level output current			4			8	mA
$t_w$	Pulse duration	$\overline{G}$ low		20			15	ns
		CLR low		10			10	
$t_{su}$	Setup time	Data before $\overline{G}\uparrow$		20			15	ns
		Address before $\overline{G}\uparrow$		20			15	
$t_h$	Hold time	Data after $\overline{G}\uparrow$		0			0	ns
		Address after $\overline{G}\uparrow$		0			0	
$T_A$	Operating free-air temperature	-55		125	0		70	°C

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	SN54ALS259			SN74ALS259			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IK}$	$V_{CC} = 4.5 V$ , $I_I = -18 mA$			-1.5			-1.5	V
$V_{OH}$	$V_{CC} = 4.5 V$ to $5.5 V$ , $I_{OH} = -0.4 mA$	$V_{CC} - 2$			$V_{CC} - 2$			V
$V_{OL}$	$V_{CC} = 4.5 V$	$I_{OL} = 4 mA$	0.25	0.4	0.25	0.4	V	
		$I_{OL} = 8 mA$			0.35	0.5		
$I_I$	$V_{CC} = 5.5 V$ , $V_I = 7 V$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5 V$ , $V_I = 2.7 V$			20			20	μA
$I_{IL}$	$V_{CC} = 5.5 V$ , $V_I = 0.4 V$			-0.1			-0.1	mA
$I_{O}^{\S}$	$V_{CC} = 5.5 V$ , $V_O = 2.25 V$	-20		-112	-30		-112	mA
$I_{CC}$	$V_{CC} = 5.5 V$		14	22		14	22	mA

‡ All typical values are at  $V_{CC} = 5 V$ ,  $T_A = 25^\circ C$ .

§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .



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## switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†				UNIT
			SN54ALS259		SN74ALS259		
			MIN	MAX	MIN	MAX	
t <sub>PHL</sub>	$\overline{\text{CLR}}$	Any Q	2	15	2	12	ns
t <sub>PLH</sub>	Data	Any Q	4	22	4	19	ns
t <sub>PHL</sub>			2	15	2	12	
t <sub>PLH</sub>	Address	Any Q	4	26	4	22	ns
t <sub>PHL</sub>			2	15	2	12	
t <sub>PLH</sub>	Execute	Any Q	4	22	4	20	ns
t <sub>PHL</sub>			2	16	2	13	

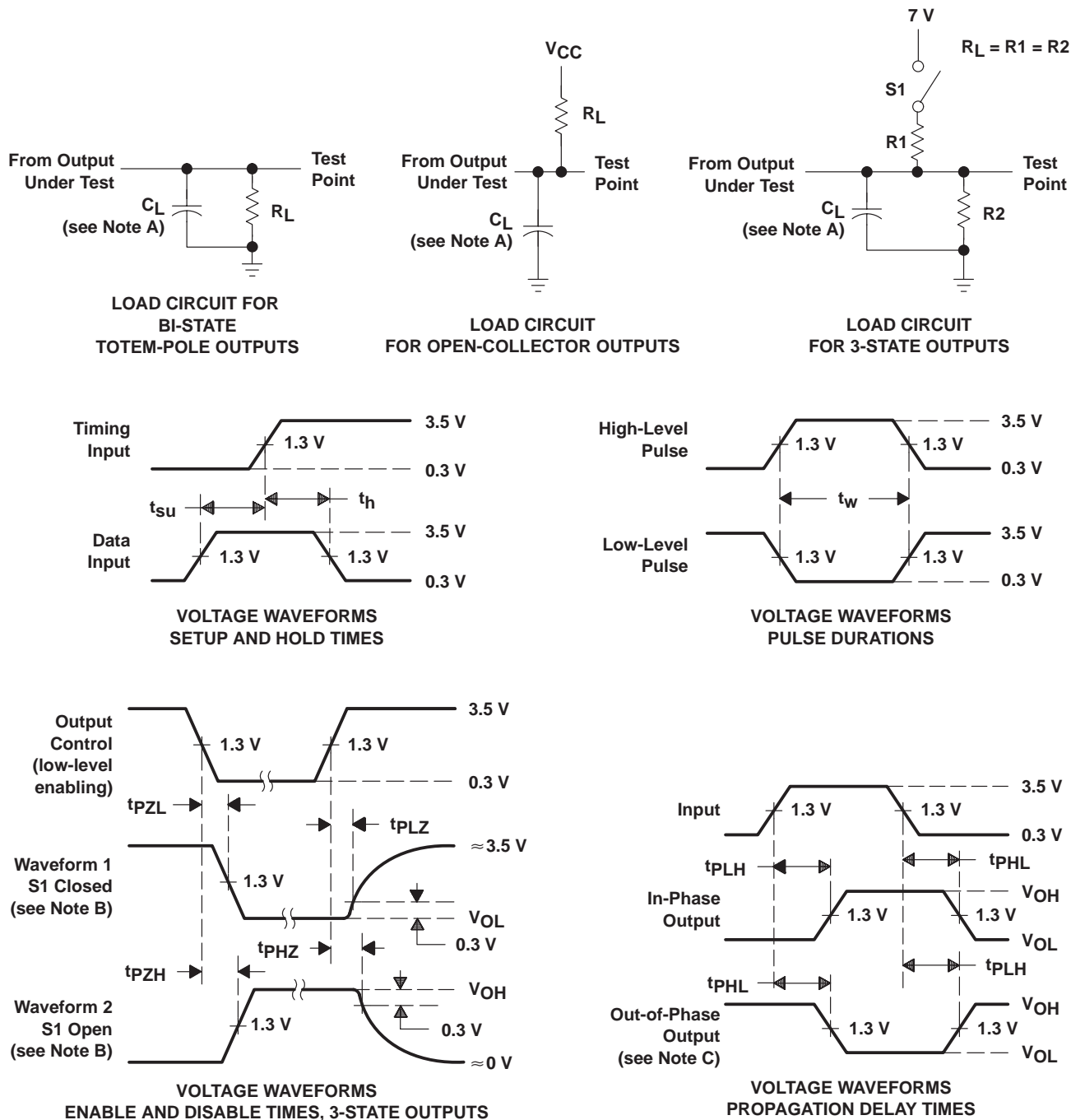
† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



# SN54ALS259, SN74ALS259 8-BIT ADDRESSABLE LATCHES

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## PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.  
 C. When measuring propagation delay items of 3-state outputs, switch S1 is open.  
 D. All input pulses have the following characteristics:  $PRR \leq 1$  MHz,  $t_r = t_f = 2$  ns, duty cycle = 50%.  
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms



**PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">5962-8874101EA</a>	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8874101EA SNJ54ALS259J
<a href="#">SN54ALS259J</a>	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54ALS259J
SN54ALS259J.A	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54ALS259J
<a href="#">SN74ALS259D</a>	Obsolete	Production	SOIC (D)   16	-	-	Call TI	Call TI	0 to 70	ALS259
<a href="#">SN74ALS259DR</a>	Active	Production	SOIC (D)   16	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS259
SN74ALS259DR.A	Active	Production	SOIC (D)   16	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS259
<a href="#">SN74ALS259N</a>	Active	Production	PDIP (N)   16	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74ALS259N
SN74ALS259N.A	Active	Production	PDIP (N)   16	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74ALS259N
<a href="#">SNJ54ALS259J</a>	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8874101EA SNJ54ALS259J
SNJ54ALS259J.A	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8874101EA SNJ54ALS259J

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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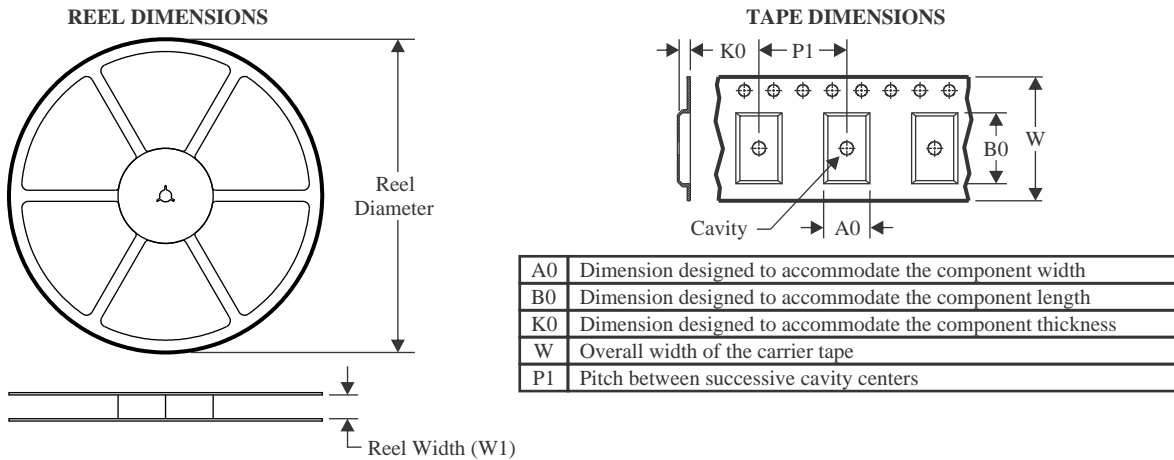
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**OTHER QUALIFIED VERSIONS OF SN54ALS259, SN74ALS259 :**

- Catalog : [SN74ALS259](#)
- Military : [SN54ALS259](#)

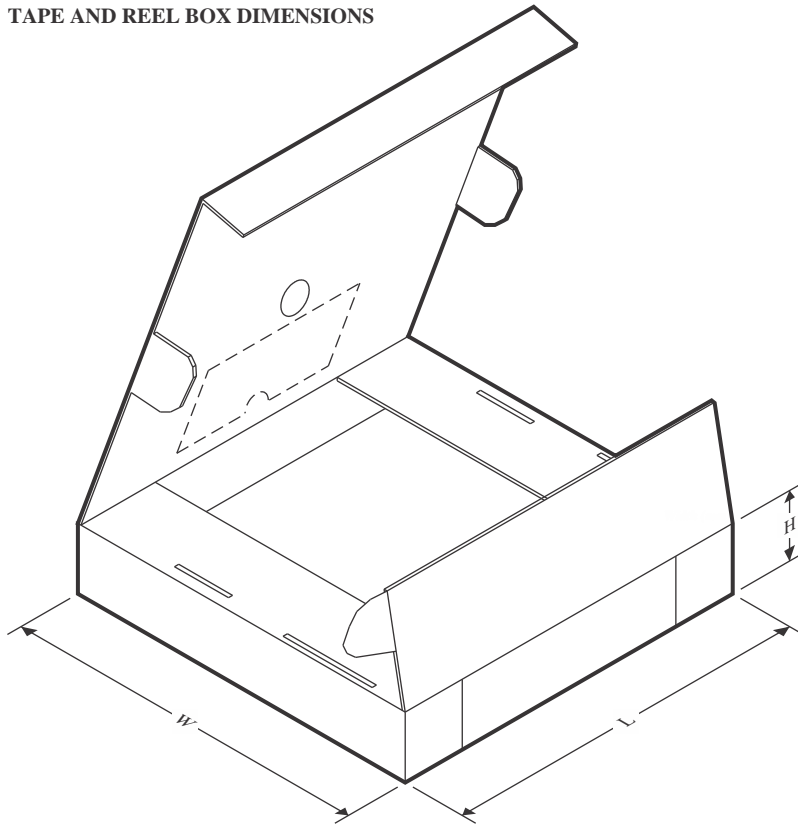
NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74ALS259DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ALS259DR	SOIC	D	16	2500	353.0	353.0	32.0

**TUBE**


\*All dimensions are nominal



Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN74ALS259N	N	PDIP	16	25	506	13.97	11230	4.32
SN74ALS259N	N	PDIP	16	25	506	13.97	11230	4.32
SN74ALS259N.A	N	PDIP	16	25	506	13.97	11230	4.32
SN74ALS259N.A	N	PDIP	16	25	506	13.97	11230	4.32

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



4040047-6/M 06/11

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  -  C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
  -  D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
  - E. Reference JEDEC MS-012 variation AC.

J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package is hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - $\triangle C$  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - $\triangle D$  The 20 pin end lead shoulder width is a vendor option, either half or full width.

4040049/E 12/2002

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Last updated 10/2025